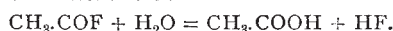


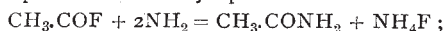
gas being colourless, and endowed with an odour somewhat reminding one of that of carbonyl chloride. In contact with water, acetyl fluoride is found to react eventually in a manner similar to its well-known analogue, acetyl chloride, forming hydrofluoric and acetic acids.



But there is a considerable difference in the degree of energy with which the decomposition occurs, for while the behaviour of acetyl chloride is almost violent, acetyl fluoride only reacts with great slowness. When a small quantity of the fluoride is dropped into water the two liquids do not mix, and the globule of fluoride only disappears after long standing. Strong solutions of potash or soda, however, decompose it rapidly, with formation of fluoride and acetate of the alkali. The action of caustic lime upon acetyl fluoride is interesting; the gas is rapidly absorbed by it, and calcium fluoride and acetic anhydride formed.



Ammonia gas reacts with considerable energy with the liquid, producing a white crystalline mass, consisting of ammonium fluoride and acetamide, CH_3CONH_2 . The latter may readily be isolated in good crystals by extraction with ether and subsequent evaporation. The gaseous fluoride reacts with ammonia in the proportion indicated by equation—



that is, two volumes of ammonia react with one volume of acetyl fluoride gas. Aniline likewise acts with energy upon the liquid, forming hydrofluoric acid and acetanilide, $\text{C}_6\text{H}_5\text{NH}\cdot\text{CH}_3\text{CO}$. The action of absolute alcohol is peculiar; it dissolves the liquid fluoride in all proportions, but after an interval of a few hours, interaction occurs with production of hydrofluoric acid and acetic ether. The latter may readily be separated by the addition of water.



Acetyl fluoride is much more stable in presence of alkaline acetates than its chlorine analogue. Even after four hours' heating in a sealed tube to 100° with sodium acetate, only a small proportion of sodium fluoride and acetic anhydride were formed. Still more stable is acetyl fluoride towards sodium amalgam, there being no appreciable reduction to aldehyde or alcohol. Metallic sodium is likewise without action upon liquid acetyl fluoride, but when heated to redness in the gaseous fluoride, the metal decomposes it with incandescence, sodium fluoride being formed and carbon deposited, together with a few drops of a liquid whose characters have not yet been ascertained. From these reactions it is evident that acetyl fluoride is a substance of a much more stable character than its analogue, acetyl chloride.

THE additions to the Zoological Society's Gardens during the past week include an Egyptian Ichneumon (*Herpestes ichneumon*) from North Africa, presented by Dr. J. Anderson; a Ring-tailed Coati (*Nasua rufa*), a Kinkajou (*Cercoleptes caudivolvulus*), a Blue-bearded Jay (*Cyanocorax cyanopogon*) from Brazil, presented by Mr. J. E. Wolfe, C.M.Z.S.; two Laughing Kingfishers (*Dacelo gigantea*), from Australia, presented by Mrs. H. M. Stanley; two Grey Hypocoliuses (*Hypocolius ampelinus* ♂ ♀) from Scinde, presented by Mr. W. D. Cumming; two Ravens (*Corvus corax*), British, presented by Mr. Gregory Haines; a Crowned Horned Lizard (*Phrynosoma coronatum*) from California, presented by Mr. R. Thorn Annan; a Common Fox (*Canis vulpes*), British, three Palm Squirrels (*Sciurus palmarum*) from India, a Brown-throated Conure (*Conurus aruginosus*) from South America, deposited; a Grey-headed Porphyrio (*Porphyrio poliocephalus*) from Persia, purchased; a Persian Gazelle (*Gazella subgutturosa* ♂), a Vulpine Phalanger (*Phalangerista vulpina* ♀), born in the Gardens.

NO. 1177, VOL. 46]

OUR ASTRONOMICAL COLUMN.

LATITUDE OBSERVATIONS AT WAIKIKI.—The *Hawaiian Gazette* for March 8 contains an account by Mr. Preston, of the U.S. Coast Survey, of the latitude observations which are being made at Waikiki on the island of Oahu, Hawaii. In it we read:—"The motion of the pole is, of course, extremely small, and the effect is that here in Honolulu we are about 50 feet nearer the equator now than we were some months ago. This change does not, however, go on indefinitely, but the motion is such that the pole returns at the end of a year to nearly its original position. Besides this annual movement, there seems to be reason to believe that there is a secular change extending over a period of at least sixty years." But no definite conclusions can be arrived at until the observations made at Honolulu are discussed in connection with those made on this side of the earth. In order to test the theory that changes of latitude are produced by the movements of large masses of molten matter in the interior of the earth, the force of gravity is measured on every night that latitude observations are made. As this is done with the idea of detecting variations, the relative and not absolute intensity is all that is required. The arrangement employed is such that if from any cause the acceleration due to gravity should be increased by only one five-hundredth of an inch, it could be easily measured. The observations will be completed in the fall of the year, but the final results cannot be known before the latter part of 1893.

MOTION IN THE LINE OF SIGHT.—*Astronomy and Astrophysics*, No. 104, contains a very important contribution by Mr. W. W. Campbell, on the reduction of spectroscopic observations in the line of sight. The paper contains an explanation of the construction and use of the tables, the limit of precision adopted being one-hundredth of a mile per second. The first table gives the velocities of the star corresponding to a known displacement of one tenth-metre in the various parts of the spectrum, from which the velocity corresponding to any observed displacement can be directly obtained. The formula

$$v_s = V_s \Delta \lambda$$

gives this velocity corresponding to any measured $\Delta \lambda$, V_s being taken directly from the tables.

Table II. gives the earth's orbital velocity, V_a , and the deviation, i , when the sun's longitude is $\odot$. These values are obtained from the formulæ—

$$\tan i = \frac{e \sin(\odot - \Pi)}{1 + e \cos(\odot - \Pi)}$$

$$\text{and } V_a = \frac{a}{\sqrt{1-e^2}} \cdot \frac{2\pi}{T} [1 + e \cos(\odot - \pi)] \sec i,$$

and when found are substituted in the equation—

$$v_a = -V_a \sin(\lambda - \odot + i) \cos \beta.$$

By tabulating V_a and i as functions of $\odot$, their values can be very easily found, and v_a consequently reduced from the last-mentioned equation.

The value of the lunar correction has been taken into account here, omitting any errors due to ellipticity of the orbit and its inclination to the ecliptic. Its value is obtained from the formula—

$$v_d = -0.29 \sin t \cos \delta \cos \phi,$$

the latitude used being that of Mount Hamilton, but corresponding corrections for any other latitudes can be found from these by multiplying them by $\frac{\cos \phi'}{\cos \phi}$, where ϕ' is the new latitude required.

THE LATE PARTIAL ECLIPSE OF THE MOON.—Fine weather was generally prevalent during the partial eclipse of the moon on May 11, affording many observers a good opportunity for noting any new features connected with such an occurrence. Considering that the eclipse was only a partial one, it may be rather difficult to decide whether it should be classed in the category of "bright" or "dark" eclipses. Undoubtedly it was not a very dark one, for during the greatest immersion the whole surface of the moon could be distinctly seen, especially with the help of a telescope, with which craters could be picked out. On the hypothesis that "dark" and "bright" eclipses are brought about owing to the different states of the solar atmosphere, the present one should have been at any rate more inclined to be "bright" than "dark," for as we are approach-

ing a spot maximum the sun's atmosphere is becoming more and more disturbed. At the time of greatest obscuration the blood-red tinge, caused by the absorption of our atmosphere, became very apparent, but this gradually wore off as the brighter part of the moon made its appearance.

From a series of photographs of the eclipsed moon taken at intervals of about a quarter of an hour, the penumbra in some of them was very distinct, especially in those taken near the time of greatest obscuration, the exposures then being comparatively long. At mid eclipse an attempt was made to obtain a photograph of the whole disk of the moon, as it appeared so distinct and clear on the ground glass, but even an exposure of 12s., using extra rapid dry plates and a 30-inch reflector, was not sufficient to bring it out, although the extent of the bright crescent and penumbra was very much increased.

DECLINATIONS OF STARS FOR REDUCTION OF VARIATIONS IN LATITUDE.—No. 263 of the *Astronomical Journal* contains the declinations of thirty-six stars, which have been obtained with the prime-vertical transit of the United States Naval Observatory. The observations were made for the determination of the constant of aberration, and consequently at the periods of maxima aberration effects, but their present publication, as Prof. S. J. Brown states, is owing to the "many requests for the observed declinations of these stars for use in discussing probable secular and periodical changes in latitude." The stars in this list are comprised in the zone $36^{\circ} 37' - 38^{\circ} 40'$. The communication contains a brief account of the methods of reduction employed, together with a reference to the instrumental adjustments.

The same number of the *Journal* contains also some results of the observations of α Lyræ, made during the years 1862-67 with the same instrument as mentioned above. The discussion of these observations was first made when Euler's value of 306 days for the periodical variation of the latitude was in vogue, but Prof. S. Newcomb, in the present case, has taken Mr. Chandler's new value, and gives, briefly, the following results:—

Mean declination of α Lyræ for 1865'0,	
assuming the latitude of the centre of the	
Observatory to be $38^{\circ} 53' 39'' \cdot 25$...	$38^{\circ} 39' 35'' \cdot 56$
Correction to Struve's constant of aberration...	+ $0'' \cdot 006$
Hence, constant of aberration ...	$20'' \cdot 451$
Parallax of α Lyræ ...	+ $0'' \cdot 24$
Coefficient of sun's azimuth in declination ...	+ $0'' \cdot 507$
Coefficient of $\sin N$...	$s = + 0'' \cdot 086$
Coefficient of cosine N ...	$c = - 0'' \cdot 087$

the value of N being assumed zero at 1864'50, increasing 308° annually.

The expression which he gives for the variation of the latitude of Washington is

$$\delta\phi = 0'' \cdot 122 \cos 308^{\circ} (t - 1864 \cdot 94),$$

the distance between the poles, or the semi-amplitude of the variation of the latitude, being $0'' \cdot 122$.

COMET 1892 DENNING (MARCH 18).—The following elements and ephemeris are given for this comet in the *Astronomische Nachrichten*, No. 3089, computed from three observations made at the Hamburg Observatory:—

T = 1892 May 11'22042 Berlin M.T.

$$\left. \begin{array}{l} \omega = 129^{\circ} 18' 34'' \cdot 4 \\ \delta = 253^{\circ} 25' 41'' \cdot 6 \\ i = 89^{\circ} 42' 4'' \cdot 3 \end{array} \right\} \text{M. Equator 1892'0.}$$

$$\log q = 0 \cdot 294619,$$

Ephemeris for 12h. Berlin M.T.

1892.	α App.	δ App.	$\log r$.	$\log \Delta$.	Br.
h. m. s.					
May 19	3 49 27	+52 13'5			
20	52 26	51 57'7			
21	55 22	51 41'8	0'2947	0'4423	0'80
22	58 15	51 25'9			
23	4 1 5	51 10'0			
24	3 52	50 54'1			
25	6 37	50 38'2	0'2948	0'4466	0'79
26	9 19	50 22'3			

The brightness at the time of discovery is taken as unity.

NO. 1177, VOL. 46]

COMET 1892 SWIFT (MARCH 6).—The elements and ephemeris of this comet are given in the *Edinburgh Circular* (No. 26), from which we make the following extract:—

1892.	R.A.	Decl.	$\log \Delta$.	$\log r$.	Br.
h. m. s.					
May 19	23 23 44	+31 52'2			
20	26 16	32 22'2			
21	28 47	32 51'6	0'1522	0'1035	0'53
22	31 16	33 20'4			
23	33 44	33 48'7			
24	36 10	34 16'5			
25	38 34	34 43'7	0'1628	0'1166	0'47
26	40 56	35 10'4			

The brightness at the time of discovery is taken as unity.

The comet is situated in the constellation of Pegasus, and on the 22nd will form very nearly an isosceles triangle with β Pegasi and α Andromedæ, the comet then lying nearly midway between η Pegasi and σ Andromedæ.

GEOGRAPHICAL NOTES.

M. LOUIS LÓCZY, in his annual address to the Hungarian Geographical Society at the commencement of the current session, expressed surprise that scientific geography was so little appreciated in England. "It is sad to see," he said, "that, despite the efforts of the oldest of Geographical Societies, the great Universities of Oxford and Cambridge have not yet established chairs of geography, and that lectureships even have only been established with difficulty."

IN the Report of the Mississippi River Commission, the extent of the levees confining the river below Cape Girardeau (Missouri) is given as 1300 miles. During the high water of 1891, the levees gave way in five places, and the total length of the breaches made in the embankment was about one mile. By far the most serious gap was that at Ames Plantation, opposite New Orleans, which attained a width of 1665 feet, and a maximum discharge of about 91,000 cubic feet per second. It overflowed 2000 square miles, one-tenth being cultivated land. The cause of this crevasse was a badly constructed rice-flume, and as the great Nita crevasse of 1890 had a similar origin, the Commission has resolved to discountenance the use of such flood-gates in future. All of the crevasses of 1891 put together discharged less water than the Nita crevasse alone in the previous year, and it was only one out of about fifty breaks which occurred during the great floods.

A NEW map of Dahomey, on the scale of 1 : 500,000, has been prepared by M. A. L. d'Albica, and published as a supplement to the new journal, *La Politique Coloniale*. All available data have been employed in its preparation, much being of course derived from itineraries unchecked by observation.

CAPTAIN GALLWEY, Vice-Consul for the Oil Rivers Protectorate, has succeeded in tracing a channel navigable for canoes through the deltaic swamps between Benin and Lagos, a distance of 160 miles.

THE *Proceedings* of the Royal Geographical Society for May contains a letter from Mr. Gilbert T. Carter, Governor of Lagos, describing a recent journey into the interior. From the summit of a hill near Ode Ondo he obtained a magnificent view to the south-east over a foreground of rocky forest-clad hills, backed by a fine range of mountains about twenty miles away, which have not previously been reported. The height of the most conspicuous summits is estimated to be from 5000 to 8000 feet above sea-level.

THE VARIATION OF TERRESTRIAL LATITUDES.

IN a letter addressed to M. R. Radau by M. Antoine d'Abbadie, which appears in the March number of the *Bulletin Astronomique*, the writer gives an interesting historical account of the work that has been done with regard to this question. As it contains also some suggestions for future work, the following *résumé* may be of service.